

CLAIMS

1. A semiconductor device characterized in that a single crystal substrate primarily containing zinc oxide has a zinc-polar surface and an oxygen-polar surface and at least one layer of thin film primarily containing zinc oxide is disposed on the zinc polar surface.
2. The semiconductor device according to Claim 1, characterized in that the thin film has zinc-polarity.
3. The semiconductor device according to Claim 1 or Claim 2, characterized in that the thin film comprises a multilayer film and the multilayer film constitute a light-emitting layer.
4. The semiconductor device according to Claim 1 or Claim 2, characterized in that the thin film comprises a multilayer film and the multilayer film constitute a switching portion.
5. A method for manufacturing a semiconductor device, the method characterized by comprising the steps of determining whether a surface of a single crystal substrate primarily containing zinc oxide is a zinc-polar surface or an oxygen-polar surface; and forming at least one layer of thin film primarily containing zinc oxide on the zinc-polar surface.
6. The method for manufacturing a semiconductor device, characterized in that the thin film has zinc-polarity.
7. The method for manufacturing a semiconductor device

according to Claim 5 or Claim 6, characterized by disposing a sputtering apparatus provided with a plasma generation chamber and a film formation chamber; and performing sputtering treatment by the use of the sputtering apparatus so as to form the thin film.

8. The method for manufacturing a semiconductor device according to Claim 7, characterized in that the sputtering treatment is performed by any method selected from among an electron cyclotron resonance plasma sputtering method, an inductively coupled plasma sputtering method, a helicon wave excited plasma sputtering method, an ion beam sputtering method, and a cluster beam sputtering method.

9. The method for manufacturing a semiconductor device according to Claim 5 or Claim 6, characterized in that the thin film is performed by any method selected from among a molecular-beam epitaxy method, a metal organic chemical vapor deposition method, a laser molecular-beam epitaxy method, and a laser abrasion method.